SOLUTION 2

UE Based and Thus Can Be Supported By UEs
Beyond Release 10

[0108] In this solution the moving relay broadcasts/signals to the idle/connected relay-UE the mobility state of the moving relay (e.g. normal/medium/high). Then, the relay-UE replaces its own current mobility state by the mobility state of the moving relay. Such signaling can be initiated for the active relay-UEs when the relay-UEs are handed over to the target cell.

[0109] In addition to that, the target cell should still be informed about the new mobility state of the relay-UE so that the correct mobility parameters can be applied.

[0110] It is noted that according to this solution, the mobility state of relay-UE will not be changed, if the target cell is a neighbor moving relay. That is, in such a case, the solution would not be necessary.

[0111] Compared to SOLUTION 1 above, the mobility state of the relay-UE has changed to the correct one in this solution. Therefore, the target cell does not need to further scale down the mobility parameters.

[0112] Moreover, similar as described above, preferably the priority of the new IE should be higher than that of the History IE. That is, the target cell should prioritize the new IE.

[0113] Thus, according to some embodiments of the present invention as described above, a new Information Element (IE) for the Mobility State Estimate (MSE) of moving relay user equipments (UEs) is sent contained in the UE_context, when the UEs are handed over to a target cell.

[0114] It is noted that the embodiments and the present invention in general is not limited to the specific examples given above.

[0115] For example, in the embodiments described above, a moving relay node is described, from which a handover to a fixed base station is to be performed. However, the moving relay node is only an example, and the invention can be applied to any case in which one of the base stations (or similar apparatuses) involved in a handover of a user equipment is moving relatively to the other.

[0116] Moreover, the embodiments described above were described with respect to the application area for the high speed trains. However, the invention is not limited to this specific application; moving relays can be also mounted on busses, trams, ferries, and any other kind of vehicles or moving objects depending on the target service. In such scenarios, the handovers of the relay-UEs are expected to be more frequent.

[0117] According to a further aspect of embodiments of the present invention, an apparatus is provided which comprises

[0118] means for providing a connection to a user equipment,

[0119] means for detecting whether a handover of the user equipment is required, and

[0120] means for, if a handover is required, establishing mobility information regarding the mobility state of the apparatus as mobility information of the user equipment, and for sending the mobility information to at least one network element involved in the handover of the user equipment.

[0121] According to another aspect of embodiments of the present invention, an apparatus is provided which comprises

[0122] means for receiving mobility information regarding a mobility state of a user equipment, which is to perform a handover from a network control element to the apparatus, and

[0123] means for using the received mobility information for preparing the handover of the user equipment.

[0124] According to a still further aspect of embodiments of the present invention, an apparatus is provided which comprises

[0125] means for receiving mobility information regarding a mobility state from a first network control element, and

[0126] means for replacing a mobility state of the apparatus by the mobility state received in the mobility information upon preparing a handover from the first network control element to a second network control element.

[0127] It is to be understood that any of the above modifications can be applied singly or in combination to the respective aspects and/or embodiments to which they refer, unless they are explicitly stated as excluding alternatives.

[0128] For the purpose of the present invention as described herein above, it should be noted that

[0129] an access technology via which signaling is transferred to and from a network element may be any technology by means of which a network element or sensor node can access another network element or node (e.g. via a base station or generally an access node). Any present or future technology, such as WLAN (Wireless Local Access Network), WiMAX (Worldwide Interoperability for Microwave Access), LTE, LTE-A, Bluetooth, Infrared, and the like may be used; although the above technologies are mostly wireless access technologies, e.g. in different radio spectra, access technology in the sense of the present invention implies also wired technologies, e.g. IP based access technologies like cable networks or fixed lines but also circuit switched access technologies; access technologies may be distinguishable in at least two categories or access domains such as packet switched and circuit switched, but the existence of more than two access domains does not impede the invention being applied thereto,

[0130] usable communication networks, stations and transmission nodes may be or comprise any device, apparatus, unit or means by which a station, entity or other user equipment may connect to and/or utilize services offered by the access network; such services include, among others, data and/or (audio-) visual communication, data download etc.;

[0131] a user equipment or communication network element (station) may be any device, apparatus, unit or means by which a system user or subscriber may experience services from an access network, such as a mobile phone or smart phone, a personal digital assistant PDA, or computer, or a device having a corresponding functionality, such as a modem chipset, a chip, a module etc., which can also be part of a UE or attached as a separate element to a UE, or the like;

[0132] method steps likely to be implemented as software code portions and being run using a processor at a network element or terminal (as examples of devices, apparatuses and/or modules thereof, or as examples of entities including apparatuses and/or modules therefore), are software code independent and can be speci-